

# Profile



BIM is presenting daily opportunities and challenges to structural engineers, rather like the architects they work with. So it should be no surprise to find that one of the key people behind the BIM revolution is, himself, an architect. **Jackie Whitelaw** talks to Autodesk Vice President, Phil Bernstein, who helped introduce BIM to the world.

**Building Information Modelling (BIM) should be in the minds of all structural engineers**, as the UK government's 2016 requirement for everyone designing public projects to be working at level 2 fast approaches. Autodesk's Revit® package is likely to be a tool they are using to create their individual 3D models.

As BIM evolves to the holy grail of level<sup>3</sup> (a single, integrated model used by the whole design team), Revit® and Autodesk will be at the heart of the evolution.

The early Revit® technology was bought by Autodesk in 2002 for \$133M to shift its building industry focus from exclusively AutoCAD® to modelling. The purchase allowed this to happen much faster than could be achieved solely through in-house development. Vice President, Phil Bernstein, responsible for the company's future strategy and technology vision, was at the heart of that decision and is generally recognised as the driving force behind a move that transformed the future, not only of Autodesk but arguably of the whole construction industry.

"My view is that if you are going to make a transition, you should do something dramatic," he says.

"With Revit®, we took a hard right turn." It was a change of direction not greeted initially with universal acclaim. "Our customers and retailers didn't understand to start with. I'd go to meetings and have 400 people yelling at me."

Twelve years on, it's a different story at those meetings; the yelling has given way to something more like cheering.

Bernstein joined Autodesk 14 years ago from a job as a principal with Pelli Clarke Pelli Architects.

"I'd wanted to be an architect from the age of 10," he says. "My uncle studied with Frank Lloyd Wright – I don't think he was wildly successful, but he was bohemian and really cool and the profession caught my imagination. So my parents got me a



drafting table and drawing instruments for my 10th birthday, and from there I went down a route that took me to graduate school, into a job and got me a licence to practise.

"And then I worked and worked and worked." Projects like Reagan National Airport's north terminal in Washington, the Adrienne Arsht Center for the Performing Arts of Miami-Dade County and the Theodore Roosevelt Federal Courthouse in New York are all on his CV.

"But after 20 years, when I was working on the corporate headquarters for Goldman Sachs in Manhattan, I had something of a midlife crisis and was asking myself: 'was this what I really wanted?'"

A college friend had given his name to a headhunter working for Autodesk and Bernstein made the move.

"I'd been involved in technology my whole career and had even worked as a computer programmer during a recession. And I was a customer used to the tools. But what Autodesk wanted from me was someone who could provide deep domain knowledge to set the future direction of the company's building industry strategy."

That was exciting but a big ask, so Bernstein started out with baby steps.

"I began by managing a small software development business within Autodesk and that meant I had to work out how to make software. It was a steep learning curve."

Revit Technology Corporation had started as an independent business in 1997, introducing its Revit® parametric modelling product to architecture in 2000. There are stories that it marketed aggressively, with Autodesk's Architectural Desktop® a particular target.

At the same time, Bernstein had come to understand that modelling was the future, so it was a quick step for him and his colleagues to decide to buy Revit® out – not to take the competition out of the market, but to take the technology and use the Autodesk software capabilities, reputation and networks to develop it to its full potential.

"Several of us made the decision, but I took it and formed it into the idea of BIM and set the strategy we followed. I had a very strong feeling that if we really wanted to do something dramatic we had to go with this," Bernstein says. "And I had the luxury of one of the greatest, longest-lasting pieces of software mankind had invented – AutoCAD® – as a base to move forward from."

That small building industry team from the early days is now 1500 strong and has expanded within engineering and building, and the company is also heavily involved in media and entertainment, and manufacturing. His strategy team sets the long-term vision across these domains.

Even so, Bernstein still feels he is very much an architect. “Architectural training is about taking a large collection of ambiguous things and guiding the process to creating the answers, though there is no set route for working a wicked problem. And I’m still doing that.

“During my career as a practising architect, I realised that what I was really interested in were the processes that go into making a beautiful building. So when we were developing our BIM strategy, an architectural design approach was critical, but so too was the structural engineering one. Structural engineers are problem solvers who are emotionally and technically aligned with architects. I’d always appreciated that and had worked with a lot of great structural engineers. I even took six structures courses – as many as I could take – at graduate school. It’s a great intellectual discipline and fundamental to BIM’s development.”


The process of how BIM is being adopted and, particularly, the contrasts between the USA and the UK currently fascinate him. Bernstein is working closely with BIM Task Group chairman Mark Bew on the development strategy in the UK.

“Some of the motivation to move to BIM derives from the problem of really narrow margins in the building industry. If the technology allows you to predict with better confidence what an outcome will be, you can be paid on outcomes. At a better margin. As an industry, it is allowing us to step back and think: ‘what are we trying to accomplish?’

“There are a couple of ways that transition is happening. In the USA, it’s a battle, the survival of the fittest. What drives industry in the USA is competitive difference and margins. Even though there are high adoption rates, there is little agreement as to what we are doing here and why.

“In the UK, the government has put a lot of money in to working out what needs to be done, so firms know when to make the jump. So the theoretical framework is in place and now everyone is on the slope and starting to climb.”

BIM in the USA is also an important part of the alternative project delivery movement. “This is predicated on some basic assertions about what we are doing now – there is no trust, no collaboration, we are not getting the results, no one is making money and we are not having any fun. So BIM provides a degree of information transparency and precision that makes it possible to get to new levels of collaboration,” Bernstein says. The BIM City simulation in [Figure 1](#) illustrates the different

 **Figure 1**  
Rendering of the BIM City Westside Hospital data set illustrating  
a) Construction  
b) Structural view  
c) Mechanical, electrical and plumbing view



perspectives that facilitate collaboration.

To prove the point, Autodesk adopted the strategy when fitting out its new East Coast headquarters in Massachusetts. Bernstein had been chair of the American Institute of Architects’ Contract Documents Committee when the organisation had written its new Integrated Project Delivery contracts. “We used the ideas from these contracts for our new building. We were in a hurry and we converted 55 000sq ft into offices, including software development space and a conference centre, to LEED [Leadership in Energy and Environmental Design] platinum standard in eight-and-a-half months, start to finish.”

The next level of collaboration – level 3 BIM and the single, integrated project model – is not, he says, imminent. “The technology is not there yet, but we are

working on what will be the technology. It is a transition. The level 2 processes will morph into level 3. But at the moment, the building industry is still working out what it means to be digital.”

Bernstein is always looking ahead, looking for the next thing. 3D printing, for instance, is being investigated. “I think what I do is shine a light on the path and I seem to be good at doing that,” he says. “I try to take a bunch of messy things and make them make sense.

“As someone who likes to plan things, I would never have said I would have ended up here. But what has served me well throughout my career is to trust in my intuition. When I took the Autodesk job, it was like jumping off a bridge. But it worked. I did the same with Revit® and that seems to have worked as well.”

What’s next?